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MUNICIPAL AND INDUSTRIAL WATER REQUIREMENTS WHITE OAK CREEK RESERVOIR TEXAS

Public Health Service
Dallas, Texas

April 1960

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MUNICIPAL AND INDUSTRIAL WATER REQUIREMENTS

WHITE OAK CREEK RESERVOIR

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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service, Region VII
Dallas, Texas

In Cooperation with the

DEPARTMENT OF THE ARMY
U. S. Army Engineer District - New Orleans, Louisiana

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INTRODUCTION

General

In a letter dated February 11, 1959, the District Engineer, U. S. Army Engineer District, New Orleans, requested the Public Health Service, Region VII Office, Dallas, Texas, to prepare a preliminary evaluation of the need for water supply storage and its value (benefits) for each of the following streams:

1. Cypress Creek above Ferrells Bridge Reservoir.
2. White Oak Creek.
3. Little Cypress Creek.
4. Bayou Dorcheat.
5. Black and Cypress Bayous.
6. Bayou Bodcau.

White Oak Creek is considered in this report, and the studies of the other streams are presented in separate reports.

Acknowledgments

Acknowledgment is gratefully made for the assistance of the Texas Department of Health, the Texas Board of Water Engineers, the Bureau of Business Research of the University of Texas, the New Orleans District of the Corps of Engineers, the Sulphur River Municipal Water District, and the city officials of the cities of Naples, Omaha, Talco, Sulphur Springs, and Mt. Vernon, Texas.

SUMMARY AND CONCLUSIONS

1. White Oak Creek is located in Northeast Texas in the Red River Basin. The tentative site for the proposed reservoir is in Franklin County northwest of the city of Mt. Vernon.

2. There are no towns or industries of significant size in the area tributary to this reservoir site which have a clearly indicated present need for water supply storage from White Oak Creek project. In the absence of a suitable present base, it is not practicable at this time to predict to what extent the vicinity may develop in the future.

3. It is believed that future growth will be concentrated in adjacent areas which are more conveniently located to existing or proposed water supply storage reservoirs such as Texarkana, Lake O' The Pines (Ferrells Bridge), Cooper, Cypress Creek and Little Cypress Creek.

4. From a water supply standpoint, the best interests of the area would be served by deferring construction of White Oak Creek project until some future date. It is recommended that the water supply needs of the area be restudied when a pattern of growth begins to develop.

DESCRIPTION OF THE AREA

Geography

White Oak Creek is located in Northeast Texas in the Red River Basin. The creek originates just east of the city of Greenville and flows easterly for about 65 miles to the Sulphur River at a point four miles north of the city of Naples. The watershed includes portions of Hopkins, Franklin, Titus, and Morris Counties. The tentative site of the proposed reservoir is at the Hopkins-Franklin County line, as shown on Figure 1.

The topography of the area is rolling to hilly. The elevation ranges from about 530 feet in Hopkins County to 300 feet in Morris County. The annual temperature ranges from 64° to 66°F, and the annual rainfall averages about 40 to 45 inches.

U. S. Geological Survey records show that the flow of White Oak Creek is intermittent. Periods of low or zero flow usually occur during August and September with an occasional extension into October and November. High flows up to 29,000 cfs have been recorded.

Economics

The economy of the area is based predominantly upon agriculture. In 1950, farm land comprised more than 80 per cent of the acreage of Franklin, Morris, and Hopkins Counties. This land is used mainly for pasture, dairy cattle being the principal livestock. Acreage for cropland in each of these counties has decreased steadily since the 1930's.

The population of Franklin County has been declining steadily since 1920 with the largest yearly decrease occurring from 1940 to 1950 (8,378 to 6,257). Mt. Vernon, which is the largest community within the county, has had a rather static population since 1920 (1,212 in 1920 and 1,433 in 1950).

The population of Morris County has also declined since 1920 with the largest decrease occurring in the 1940 to 1950 period (11,457 to 10,172). Two of the larger communities within the county, Daingerfield (population of 1,668) and Omaha (population of 735), however, have shown a steady increase in population since 1920. Naples (population of 1,346) declined in population from 1910 to 1940 but showed an increase of 60 per cent between 1940 and 1950.

Small portions of Hopkins and Titus Counties are located in the White Oak Creek watershed. The only community of size in these two counties is Talco (population of 917) which is located in Titus County. In the late 1930's Talco was the center of oil production activities in East Texas, but the Talco field has diminished to such a point that very little oil is currently produced. There has been some activity in new production, but nothing substantial has been developed. The population of Talco has been static since 1940. Sulphur Springs, in Hopkins County, was considered in this study. However, it is understood that this community plans to obtain water from the proposed Cooper Reservoir which will amply serve its future needs.

Populations of the various counties and communities within the area of influence of the proposed project are given in Table 1.

Table 1

Populations (1900-1950)*

County or Community	1900	1910	1920	1930	1940	1950
Hopkins County	27,940	31,038	34,791	29,410	30,274	23,490
Franklin County	8,674	9,331	9,304	8,494	8,378	6,257
Titus County	12,292	16,422	18,128	16,003	19,228	17,302
Morris County	8,220	10,439	10,289	10,028	9,810	9,433
Sulphur Springs	3,635	5,151	5,558	5,417	6,742	8,991
Mt. Vernon	-	-	1,212	1,222	1,443	1,433
Talco	-	-	-	-	912	917
Naples	-	1,178	887	341	821	1,346
Omaha	-	-	492	506	623	735

*U. S. Bureau of the Census

Water Uses

White Oak Creek watershed serves as a water supply source for the cities of Sulphur Springs and Mt. Vernon. Other cities in the area obtain their water supply from underground sources. The cities and their water uses are listed in Table 2.

Table 2

Present Water Supplies

Municipality	1950 Population	Population Served 1957	Water Use 1957	Water Supply Source
Mt. Vernon	1,433	2,220	0.15	Imp. on trib. of White Oak Cr. and Wells
Sulphur Springs	8,991	12,000	0.86	Imp. on White Oak Creek
Saltillo	400	-	-	Individual
Sulphur Bluff	500	-	-	Individual
Talco	917	1,050	-	Wells

Water Quality

The Texas State Department of Health has a sampling station on White Oak Creek north of Omaha as a part of a state-wide water quality sampling program. The data available show that the chemical quality is generally good but the chlorides, sulfates, and total solids are high at times. Table 3 summarizes the average, maximum, and minimum results for chlorides, sulfates, total solids, and pH for the period September 1957 to March 1959.

Table 3

Water Quality of White Oak Creek

	Maximum	Minimum	Average
Chlorides, ppm	1,190	8	146
Sulfates, ppm	265	7	57
Total Solids, ppm	2,280	44	400
pH	8.4	4.7	-

Stream Pollution

The city of Sulphur Springs discharges its waste waters after secondary treatment to the White Oak Creek at a point about 25 miles above the tentative site for the Corps of Engineers' project. The wastes would be expected to cause adverse water quality in the reservoir during periods of low inflow to a greater degree and for longer periods than if the stream were free flowing. Even though the water might be of acceptable quality by the time it would reach the municipal water intakes, the aesthetic considerations of this situation may make the reservoir less desirable for water supply than it would be if wastes were disposed of elsewhere.

The city of Mt. Vernon discharges its treated wastes to a tributary which joins White Oak Creek below the dam site. No damage is expected to be caused by wastes from Mt. Vernon when the stream flow is maintained at about two cfs at the point where the wastes enter White Oak Creek.

The city of Talco discharges its wastes to the Sulphur River basin after treatment. The cities of Omaha and Naples treat their wastes in lagoons, and no report is available on the discharges.

FUTURE DEVELOPMENT OF THE AREA

Northeast Texas is well situated from the standpoint of markets, transportation, labor supply, and other industrial location factors. However, the factors for potential industrial growth which the White Oak Creek area possesses can be found to a much greater degree in other nearby areas. Several communities within a 50-mile radius of the proposed project have, in addition to the factors mentioned, an abundant supply of water for present and anticipated municipal and industrial needs. The greatest future industrial activity in Northeast Texas, which is dependent on water, is most likely to occur in the proximity of Cooper Reservoir to the west (now in the planning stage), Texarkana Reservoir to the east with a potential M. & I. storage capacity of 120,000 acre-feet, and the Lake O' The Pines to the southeast with 250,000 acre-feet. Even if the area under study were well supplied with water, it would still be faced with keen competition for new industry. As a consequence, it appears that the prospects are not great for rapid growth of communities in the vicinity of the proposed White Oak Creek project, nor does it seem likely that industrial development of any significance will take place.

Although the communities in the project area are not expected to develop industrially, they will probably experience a population growth due to their proximity to the future industrial areas which are expected to develop in East Texas. Mt. Vernon and Talco may serve as residential areas for the industrial centers of Sulphur Springs, 30 miles to the west, and Ferrells Bridge Reservoir, 40 miles to the south. Omaha and Naples may also serve as residential areas for Ferrells Bridge, 30 miles to the south, and the Texarkana area, 40 miles to the east. Omaha currently serves as a residential area for many of the employees of the Lone Star Steel Company plant which is located some 15 miles south of Omaha. It is estimated that 90 per cent of the present labor force of Omaha are employed by the Lone Star plant.

WATER PLAN

The area considered as a potential market for water supply from White Oak Creek Reservoir would include the communities of Saltillo, Sulphur Bluff, Mt. Vernon and Talco - all located within 10 miles of the tentative site. The downstream communities of Omaha and Naples were also considered since they could possibly obtain reservoir water through downstream releases. The community of Mt. Pleasant could be included in the latter group although the greater distance from White Oak Creek (about 12 miles) would make the proposed Cypress Creek Reservoir (only 6 miles from the town) more feasible for their water supply.

The per capita water use in these communities is expected to increase to about 180 gallons per day by the year 2010. In the water requirement predictions which follow, it has been assumed that this per capita figure will include such industrial use as may develop.

Mt. Vernon

It is expected that Mt. Vernon will have a population of 2,500 by the year 2010 with a water supply need of about 0.45 mgd. The present source, an impoundment on a tributary of White Oak Creek with a storage capacity of 420 acre-feet, now supplies water at a rate of about 0.15 mgd. Three shallow wells are used to supplement the surface supply. Ground water cannot be relied on to meet future needs, since the city is located outside the area of good water-bearing aquifers. Therefore, the city will need to augment its present surface supply in the amount of about 0.2 to 0.3 mgd, either by enlarging its existing dam or by an additional impoundment, on a local tributary of White Oak Creek.

In view of the small amount of additional supply needed and the relatively high rainfall in the area, it is considered that the most economical alternate source to the White Oak Project, for Mt. Vernon, would be a single-purpose dam in the immediate vicinity and that no great difficulty should be encountered in finding a suitable site. A detailed investigation has not been made but, by comparison with the estimated costs of similar projects in the region, it is believed that such a supply could be developed at a storage cost on the order of five cents per thousand gallons. This is less than the estimated cost of transmission from other area reservoirs such as Cooper or The Lake O' The Pines (Ferrells Bridge).

Talco, Omaha, and Naples

Water needs for the cities of Talco, Omaha, and Naples may be met by wells. A summary of water needs is presented in Table 4.

Table 4

Future Populations and Water Needs

Municipality	2010 Population	2010 Water Needs (mgd)	Source For Future Water Needs
Mt. Vernon	2,500	0.45	Tributary of White Oak Creek
Talco	1,500	0.3	Wells or Tributary Impoundment
Omaha	1,500	0.3	Wells
Naples	2,900	0.6	Wells

APPENDIX

9.B

EXHIBIT A

Basic Data and Assumptions Used in Calculations

	Pipeline	
	Mt. Vernon to White Oak Creek Reservoir	Mt. Vernon to Cooper Reservoir
Size	8"	8"
Length	7 mi.	20 mi.
Cost Per Foot in Place	$4.30	$4.30
Average Pumping Rate (mgd)	0.7	0.7
Energy Cost (¢/KWH)	1.0	1.0
Cost of Transmission (¢/1,000 gal.)	3.7	10.6

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